1. **MA 16500 – Analytic Geometry and Calculus I**

2. **Credits and contact hours:**
   4 credits
   Lecture – 3 days per week at 50 minutes for 15 weeks.
   Recitation - 1 day per week at 50 minutes for 15 weeks.

3. **Instructor's or course coordinator's name:** Kenji Matuski, Xiaodong Huang, Evzenie Coupkova, Silvio D. Mayolo, Justin A Fong …

4. **Textbook(s):** *Bundle: Calculus: Early Transcendentals, Loose-Leaf Version, 8th + Enhanced WebAssign Printed Access Card for Calculus, Milti-Term Courses,* James Stewart, Brooks Cole, 8th Edition, (Notes-other options include access sheet for e-book (9781285858265) or buying e-book & homework access directly through WebAssign.) ISBN 9781305616691
   a. **Other supplemental materials:** None

5. **Specific course information**
   a. **Catalog description:** Introduction to differential and integral calculus of one variable, with applications. Conic sections. Designed for students who have had at least a one-semester calculus course in high school, with a grade of "A" or "B", but are not qualified to enter MA 16200 or 16600, or the advanced placement courses MA 17300 or 27100, or the honors calculus course MA 18100. Demonstrated competence in college algebra and trigonometry. Typically offered Fall Spring. CTL:IMA 1602 Calculus – Long I
   b. **Prerequisites or co-requisites:** ALEKS Math Assessment 085 or SATR Math 670 or SAT Mathematics 650 or ACT Math 29 or MA 15800 Minimum Grade of B-
   c. **Course status:**

6. **Specific goals for the course**
   a. **Student Learning Outcomes:**
      1. To compute limits and to apply limit laws.
      2. To apply rules of differentiation to compute derivatives of elementary functions.
      3. To sketch graphs of functions with the aid of differentiation techniques.
      4. To find maxima and minima of functions; optimization problems.
      5. To compute integrals of some elementary functions and to apply the Fundamental Theorem of Calculus to compute areas of certain planar regions.
   b. **Relationship of course to program outcomes:**

7. **Topics**
   Weeks
   1 Mathematical Models; A Catalog of Essential Functions; New Functions from Old Functions, Exponential Functions, Inverse Functions and Logarithms

2	The Tangent and Velocity Problems, The Limit of a Function, Calculating Limits Using Limit Laws
3	Continuity, Limits at Infinity; Horizontal Asymptotes
4	Derivatives and Rates of Change, The Derivative as a Function, Derivatives of Polynomials and Exponential Functions
5	The Product and Quotient Rules, Appendix D
6	Derivatives of Trigonometic Functions, The Chain Rule
7	Implicit Differentiation, Derivatives of Logarithmic Functions, Rates of Change in the Natural and Social Sciences, Hyperbolic Functions (omit inverse hyperbolic functions)
8	Exponential Growth and Decay, Related Rates
9	Linear Approximations and Differentials
10	Maximum and Minimum Values, The Mean Value Theorem, How Derivatives Affect the Shape of a Graph
11	Indeterminate Forms and L'Hospital's Rule, Summary of Curve Sketching
12	Optimization Problems
13	Antiderivatives, Area and Distances, The Definite Integral, The Fundamental Theorem of Calculus
14	Indefinite Integrals and the Net Change Theorem, The Substitution Rule